

NORMAL YEAR FIRE REHABILITATION PLAN AND EMERGENCY STABILIZATION AND RESTORATION

ENVIRONMENTAL ASSESSMENT NO: UT-080-03-0180

1.0 PURPOSE AND NEED

The purpose of a Normal Year Fire Rehabilitation Plan (NFRP) is to streamline the Emergency Stabilization and Restoration (ESR) procedures to enable on-the-ground treatments to be completed in the Vernal Field Office (VFO) within time frames that are consistent with the urgent nature of fire rehabilitation. The NFRP contains information on those areas where fires are most likely to occur, what type of rehabilitation treatments are needed and where, and an environmental assessment of the impacts of rehabilitation practices and measures. The NFRP reduces the repetitive preparation of individual rehabilitation plans, saving time and cost. An approved plan and Environmental Assessment (EA) would allow for the timely implementation of ESR projects as determined by the Field Office Manager. A plan/EA would cover a 10-year period.

ESR treatments are designed to reduce adverse effects of wildfire by reducing:

- loss of additional watershed cover (vegetation),
- loss of soil and on-site productivity,
- loss of water control and deterioration of water quality,
- damage to property on and off site,
- invasion of burned area by highly flammable plants (annuals),
- invasion of noxious weeds, and
- destruction of wildlife habitats
- degradation of cultural resources

This NFRP/EA would cover BLM administered public lands in the VFO (see map). State and private lands have not been considered, as appropriated money for ESR project work is limited to federal lands by statutory regulation. The Natural Resource Conservation Service administers fire rehabilitation efforts for private lands, and state agencies administer fire rehabilitation efforts for state lands.

The priority areas for ESR treatments in the VFO are those that would continue to deteriorate at an accelerated rate following a wildfire due to extremely sensitive soils, topography or human influence. These areas are also important for livestock and wildlife forage production and habitat.

1.1 Issue Identification

No public scoping was conducted on the proposed project. Internal scoping between and among resource specialists, fire management specialists, and management

occurred very early during consideration of the project. Environmental issues associated with the proposed project and alternatives dealt with the impacts of fire rehabilitation on Special Status plants and animals, cultural resources, soil erosion, invasive species, and wilderness values

1.2 Conformance with Land Use Plans

Emergency fire rehabilitation practices discussed in this EA are consistent with the decisions found in the Bookcliffs RMP Record of Decision (1985) and the Diamond Mountain RMP Record of Decision (1994). The Diamond Mountain Record of Decision specifically allows for fire rehabilitation practices (FM01, p. 2-9) The Bookcliffs Record of Decision allows for reduced erosion, improved watersheds, and stabilization of disturbed areas through vegetative manipulation.

The Vernal Field Office is in the process of producing a Field Office wide Resource Management Plan. In this new planning effort, ESR treatments are being developed and analyzed.

1.3 Relationship to Statutes, Regulations, Policies & Consistency with Plans

Fire rehabilitation actions are authorized under BLM Manual H-1742-1. The proposed action would be consistent with the Duchesne, Dagget ,and Uintah County Land Use Plans. Though fire rehabilitation actions are not specifically mentioned, actions designed to maintain the productivity of the natural resource base are a key component of the plans.

2.0 Alternatives

2.1 Proposed Action

After each wildfire occurrence, the Field Office Manager would select an emergency fire rehabilitation team to evaluate the areas burned by wildfire and to determine if ESR treatments are needed. If needed, this team would then develop the ESR Plan and supporting documents. For BLM fires, the plan would generally be ready for signature by the Field Office Manager within 10 days of the fire being controlled. Additional time may be required for multi-agency fires. An NFRP Supplement would be prepared with additional NEPA documentation that describes the site-specific rehabilitation actions to be taken. It would include public notification and requires a Decision Record (DR) and Finding of No Significant Impact (FONSI) for authorization. Each supplement is tiered to this plan/EA, which in turn is tiered to the Final Environmental Impact Statement (FEIS), Vegetation Treatment on BLM Lands in Thirteen Western States (May 1991), and to the Utah Record of Decision (ROD) dated July 1991. The additional NEPA documentation would include a discussion of the fire; the resources damaged by the fire and the values at risk; the proposed rehabilitation practices to be implemented; any impacts not discussed in this EA; applicable project stipulations; and financial requirements

The proposed action would implement needed ESR treatments following wildfires in a timely and cost effective manner. It is preferable to complete treatments in late fall following fire occurrences, but no later than the beginning of the next growing season. ESR treatments would be initiated in those areas that meet one or more of the following criteria:

- 1) areas highly susceptible to accelerated soil erosion as determined by the emergency fire rehabilitation team.
- 2) where perennial grasses and forbs (fire tolerant plants) cannot reasonably be expected to provide soil and watershed protection within two years after the fire. These areas are usually dominated by annual vegetation, but may include areas where little native understory exists that may take too many years for native perennial recovery.
- 3) where the need to establish a vegetative fuelbreak system of less flammable species (greenstrips) has been identified to protect resources and private property.
- 4) where unacceptable vegetation, such as noxious weeds, may readily invade and become established following a fire. This could also involve some herbicide treatment as needed.
- 5) where shrubs are a crucial habitat component for wintering mule deer, antelope, and/or sage grouse.
- 6) where rehabilitation is necessary to meet land use plan objectives, including rangeland seedings.
- 7) where necessary to protect water quality.
- 8) where needed to stabilize and/or protect cultural resources

Funding for ESR treatments would usually be with ESR monies with the option of supplementing these funds from normal appropriations or contributions from outside the Bureau. If any non-BLM lands are within the burn, the Team Leader would contact the landowner or managing agency for possible coordination in the rehabilitation. For any fires involving private lands, contact would be made with the Natural Resource Conservation Service (NRCS) who provides landowners with technical assistance and has other assistance programs available on a case by case basis.

Due to the broad spectrum of situations encountered in ESR, several possible treatment options, either separately or in combination, must be considered. Treatments that would be used by the VFO are outlined below:

1. Natural Revegetation with Closure to Livestock Grazing. In many cases, successful reestablishment of native species or prior rangeland seeded areas would occur in burned areas if the perennial plant species were not killed as a result of the fire, or if viable and desirable seed or root mass is present. Utah's guidelines for grazing management require that burned rangelands be rested from grazing for one complete growing season following the burn (where there is no reseeding). At the end of that period, the area is evaluated to determine if grazing can be permitted or if additional deferment is necessary.

2. Seeding of Burned Areas. If the decision is made that seeding is necessary to reestablish a desirable perennial plant community in a reasonable time frame, one, or a combination of the following methods would be used:

(1) use of a rangeland type drill or seeder, (2) aerial broadcasting of seed followed by a treatment to cover the seed, or (3) aerial broadcast only.

Seeding with the rangeland type drill or drills is the preferred method and would be used to the extent possible. However, some burned areas are either too steep, too rocky, or are covered by standing burned trees which are too thick to maneuver rangeland type drills through. In these situations, covering the seed once its flown on by dragging a chain, pulled by two crawler type tractors, over the seeded area may be used. In some cases, usually on slopes over 30%, it may be necessary to aerial broadcast the seed only. Seeding success with this methodology is low and so it would be used only on a site by site basis and only where there is evidence or documentation that it would be successful. Browse seed may be planted with a seed dribbler. This technique involves dropping (dribbling) the seed from a seed container attached to the crawler tractor onto the tractor's steel tracks. The seed is then pressed into the soil as the tractor treads roll over it. All seeded areas would be protected from livestock grazing for a minimum of two growing seasons. Other options for covering seed would be considered, depending on the local conditions. For instance, for critical areas or small burned areas, seeding might include hand raking or use of livestock to trample seed.

Seed mixtures and application rates would be formulated and designed for specific precipitation zones and wildlife habitat types. Parameters such as soil properties, erosion potential, aspect, elevation, precipitation, intended use, potential (or desired) plant community, threat to existing watershed, and seed availability and cost also would be evaluated when formulating seed mixtures.

These criteria apply to the use of native seed as well as cultivated species. Local seed sources for native plants and subspecies adapted to the site would be emphasized. As new seed cultivars are developed, their effects and possible benefits will be evaluated. Seed mixtures may be modified for use in areas containing Special Status plants and/or State listed noxious weeds; especially if herbicides would be needed to control weeds following the fire.

3) Reforestation

Reforestation efforts would be applied to forested areas that are determined to be of high value for scenic and/or wildlife values, and require tree plantings in order to accelerate the rate of tree recovery. Tree plantings would be conducted by hand.

Rehabilitation Criteria

(1) Seed would be applied only in designated areas at the specified rates and mixtures. Use of native species would be emphasized as appropriate depending on the cost and availability and in compliance with BLM Manual 1745. All seed used would be tested for

noxious weeds, purity, and germination prior to application. Certified seed would be tested for the same factors as other seed unless small quantities (less than 200 lbs.) are being used. Certified seed would be used when available to insure that desired genetic traits are present. The use of "source identified seed" may be used when native seed is collected from wildland sites to insure that a local or otherwise adapted seed source is used to revegetate the burned area.

(2) Large islands of unburned vegetation would not be seeded. The "edge affect" would be increased through irregular boundaries and maintained throughout the rehabilitation process.

(3) Special Status Species (SSS) inventories in conformance with current Bureau policy would be completed prior to any new ground disturbing activities. A Cultural Resource inventory would be completed for all ESR treatments that have the potential to affect cultural resources. If cultural resource and/or SSS values are present, the areas would be either avoided or mitigated, depending upon the situation. Appropriate consultations would be completed prior to any new ground disturbing activities. The results of such consultations would be factored in to the final plan and decisions.

(4) Native American Tribes having historical/cultural ties to the area would be consulted prior to project implementation in order to identify resources and subsequent mitigation strategies.

(5) Cultural resource inventories would be conducted for all seedings that have the potential to affect cultural resources. If cultural resources are present they would be mitigated as appropriate. Potential mitigation treatments include; avoidance, hand seeding sites to camouflage and reduce erosion, and incorporating sites into larger avoidance zones where sites would blend into the surroundings.

(6) Areas scheduled for EFR treatments would be field checked for soil, climate, and/or multiple use management constraints to insure that the proposed treatment is appropriate.

(7) Livestock exclusion for the one or two growing seasons would be accomplished by fencing, closing specific pastures, herding in sheep allotments, or closing entire allotments. Specific terms and conditions would be added to the affected grazing permittee's permit for the duration of the rehabilitation effort and/or until the specific goals and objectives of the rehabilitation effort are met. Areas would be protected from other uses, such as recreation, if it is determined this would interfere with seeding establishment.

(8) Drill rows and all seed covering projects would run along the contour of the land, where possible to reduce erosion.

(9) Browse species, with the exception of four-wing salt bush, forage kochia, winterfat, Gardner saltbush, and sagebrush, would generally only be seeded in areas receiving greater than 12 inches of precipitation.

(10) To the extent feasible, only native species would be used in Wilderness Study Areas and ACEC's.

(11) Seeds of species requiring scarification would be properly treated to ensure timely germination.

(10) Monitoring studies would be established to determine: the effectiveness of each seeding relative to ESR objectives; to evaluate new technology; and to indicate when grazing and other uses may be resumed. Monitoring priority would be given to those areas where unique treatments were implemented or where resource values or public concerns are high and to detect changes between untreated control areas and treated areas.

(12) When ESR seedings are conducted in sage grouse areas, these activities would be conducted in accordance to the most current Western States Sage Grouse Guidelines to the greatest extent possible. Seed mixtures would include forb species and appropriate species of sagebrush.

(13) When ESR seedings are conducted within crucial big game habitat areas, the seed mixtures would be amended to include forb and browse species.

(14) Necessary precautions would be taken to avoid active raptor nests and to avoid disruptions to nesting and rearing activities. Precautions would also be taken to avoid disruptions to nesting and rearing activities of migratory birds.

(15) Hazardous fuel breaks would be established at strategic locations to reduce the size and frequency of future wildfires. Vegetative fuel breaks would also be considered where applicable. Vegetative fuel breaks, also called green-strips, are blocks of fire resistant vegetation, designed to reduce the size and frequency of future wildfires.

(16) Seed mixtures would take into account competition from invasive introduced weeds such as cheatgrass and State listed noxious weeds that readily invade burned areas. Once a site is dominated by cheatgrass, succession does not proceed toward the original community. Cheatgrass changes not only the fire frequency of the site, but also the fire intensity and extent of the area likely to burn in the future. In this situation it may be necessary to reseed with adapted species to stabilize the site, prevent soil erosion, and reverse the trend which leads to a cheatgrass monoculture.

(17) The Utah Riparian Management Policy (1993) and the riparian decisions in both the Bookcliffs and Diamond Mountain RMPs would be followed on burned riparian areas.

(18) All phases of proposed projects would be monitored by a qualified project inspector.

(19) Special Status Plant Species would be evaluated on a case by case basis. Seeding methods and use of competitive plant species would be evaluated to ensure that negative impacts would be mitigated.

(20) Rehabilitation work required as a result of emergency fire conditions in Wilderness Study Areas may involve a range of ESR treatments. These treatments would be carried out to the extent feasible in a manner that would not impair wilderness suitability.

(21)) Rehabilitation work required as a result of emergency fire conditions in Areas of Critical Environmental Concern may involve a range of ESR treatments. These treatments would be carried out to the extent feasible in a manner that would be consistent with the management objective and management prescriptions for that particular ACEC.

(22) Public notification, including Native American consultation, is sought, and would be referenced in the final NFRP. Any tribal input would be considered in the decision-making process for each project.

3. Construction of Erosion and Sediment Control Structures. Watershed structures such as retention dams or land treatments, including contour furrowing, and straw wattles may be constructed/installed to control erosion, sediment yield and flood waters. In most cases, these would be used in conjunction with the seeding treatment. Gully check dams or plugs may be required where head-cutting erosion is occurring. Gully treatment could also include broadcast seeding followed by chaining to cover the seed to establish perennial vegetation on the sides and bottom of existing gullies.

a. Erosion and Sediment Control Structure Criteria. Planning, design, and construction of erosion and sediment control structures and floodwater retarding structures would be done in accordance with BLM Manual 9172, Water Control Structures. Materials used would be of local origin to the greatest extent possible, with installation by local personnel and equipment.

4. Support Facilities and Standard Operating Procedures. Fences, gates, cattleguards, and other control features would be repaired and/or constructed as needed to protect seedings or other improvements during the rehabilitation period. Damaged fences which provide protection would be repaired and/or constructed around the burned area until the native vegetation or revegetation is successfully re-established.

Minor improvements damaged by wildfire would be replaced or repaired as necessary to meet land use or activity plan objectives, including signs, corrals, wildlife guzzlers, etc.

a. Fencing Criteria.

- (1) Generally, all fence posts, braces, and gates would be steel or non-flammable material.
- (2) Raptor surveys and Special Status Species clearances would be completed along proposed new fence lines prior to any construction activity. Mitigation or avoidance would take place if raptor nests, and/or Special Status Species resources are present.
- (3) A Cultural Resource inventory of all new fences, gates, cattleguards, and /or other control features would be completed prior to any surface disturbance. A cultural resource inventory would not be required for the reconstruction or repair of existing fences that have previously been subject to the NHPA Section 106 process.
- (3) Fence construction and reconstruction would conform to the BLM Manual Handbook H-1741-1 (with the exception of all metal material). Any exceptions to this must be approved by the authorized officer.
- (4) All necessary easements would be acquired prior to construction.
- (5) Fences in wild horse areas would be designed to be visible to horses and would have at least one gate installed per mile and/or every corner.
- (6) All fences would conform to standard BLM fence specification in big game habitat areas in order that big game movement would not be restricted.

2.2 No Action

Under this alternative, no ESR treatments would be implemented following wildland fire events. This alternative would then be inconsistent with Bureau policy (BLM Manual Handbook H-1742-1) and not in conformance with the existing land use plans by allowing for the likelihood of undesirable vegetation establishment and degradation of wildlife habitat. Therefore this alternative will not be considered further in this document.

2.3 Alternatives Considered but Dropped from Further Consideration

Alternative 1 Rehabilitation treatment only in excessive soil loss areas.

This alternative would provide ESR treatments only in areas with existing excessive soil losses that have a Wind Erodibility Group (WEG) rating of moderate to very high, and/or finer textured soils that are highly susceptible to water erosion. However this alternative would not consider other criteria, including the likelihood of undesirable

vegetation establishment, and the adequacy of wildlife habitat. This alternative would then be inconsistent with Bureau policy (BLM Manual Handbook H-1742-1) and would also not be in conformance with the existing land use plans cited in Section 2.0 of this document. Therefore this alternative will not be considered further in this document.

3.0 AFFECTED ENVIRONMENT

3.1 Critical Elements of the Human Environment

The following critical elements of the human environment are elements subject to the requirements specified in statute, regulation, or executive order that must be considered in all environmental assessments (BLM H-1790-1, Appendix 5). The following table identified those critical elements determined by BLM to not be affected by either the Proposed Action or the alternatives. A rationale is provided for BLM's determination, and if appropriate, that critical element is not analyzed further. Critical elements that may be affected are described in the affected environment and impacts on them analyzed in detail in the environmental consequences section.

Value	Rationale
Prime Unique Farmlands	None Present
Environmental Justice	There are no known minority or lower income populations present.
Wild and Scenic Rivers	None Present
Hazardous Wastes	No chemicals subject to SARA Title III in amounts greater than 10,000 lbs. Would be used. No extremely hazardous substances as defined in 40 CFR 355 in threshold planning quantities would be used.
Noxious and Invasive Weed Species	The proposed action is designed to reduce the invasion/increase of noxious and invasive weed species following a wildland fire event. Thus the proposed action should limit noxious/invasive species from increasing or invading.

3.2 Soils/Watershed The Vernal Field Office lies within the Colorado Plateau and the Middle Rocky Mountains physiographic provinces.

Soils within the VFO were developed in parent materials derived primarily from sedimentary rock of the Uinta mountains and the West Tavaputs plateau. Soils are comprised mostly of desert and semi-desert type soils (Aridisols and Orthents). Within the higher elevations the more mesic soils (Borolls) are found.

The primary factor in soil erosion susceptibility is slope, tempered by vegetation type and density. Some steep slopes with favorable vegetation characteristics are of only moderate susceptibility, while some milder slopes with unfavorable vegetation characteristics have potential for significant erosion. Lands of slight to no water erosion susceptibility consist of relatively flat benches, alluvial fans and floodplains, and are subject to wind erosion when vegetation cover is removed. Approximately 45% of the soils in the VFO are highly susceptible to erosion, 35% are moderately susceptible, and 20% are low.

3.3 Precipitation and Water Resources

Average annual precipitation ranges from 6 to 24 inches or more. The majority of the field office lies within the 6-14 inch precipitation zone. Runoff from the adjacent mountain ranges provide the major water sources for the streams and rivers of the field office. The ground water resources are tapped by wells which provide water for domestic use, irrigation of crops, and livestock consumption.

3.4 Air Quality. Air quality in the VFO is classified as an attainment area, meaning the area meets the National Ambient Air Quality Standards primary and secondary air quality standards. The PSD standards allow for the maximum deterioration described under the criteria for a Class II air quality area. Class II air quality allows for some degradation associated with moderate and well controlled growth.

3.5 Vegetation

Ecological site descriptions have been developed for the VFO, in conjunction with the 3Rd order soil survey. These descriptions provide detailed information regarding vegetative communities. For the purposes of this analysis, the vegetation component has been grouped into several broad plant communities.

Annual Grass. This community occurs within large drainage bottoms/floodplains, and benches. Slopes range from 2 to 25 percent, and elevations range from 5,000 to 6,000 feet. These area were once comprised of a shrub/grass community, but are now dominated by cheatgrass and annual forbs, as fire and historic over grazing have resulted in the present day annual composition. The potential vegetative composition is about 55% shrub, 35% grass, and 10% forbs. Fire occurrence in this type has generally been high.

Pinyon-Juniper Woodland. This type occurs in mostly within the mid to upper elevation foothills, benches, and hillslopes within the VFO, and comprises about about 35% of the vegetative composition. Typical slopes range from 5 to 70%. Elevations

range from 5,500 to 7,500 feet. This plant community is characterized by pinyon pine, Utah juniper, galleta, Indian rice grass, and needle and thread grass; along with sagebrush at the lower ranges, and mountain browse species at the higher ranges. Juniper and pinyon trees dominate this vegetative type. Vegetative composition is about 20% grasses, 15% forbs, and 65% shrubs and trees. Fire occurrence in this type is quite frequent in the VFO.

Sagebrush. This vegetative type comprises about 25 % of the vegetative composition within the VFO. This type includes the Wyoming sage type, the mountain sage, and basin big sage. This vegetative type occurs on about all landforms, and all aspects within the field office. Slopes range from 2 to 50% percent but slope gradients of 4 to 15% percent are most typical. Elevations range from 5,200 to 7,000 feet. The plant community is characterized by needle and thread, various wheatgrasses, Indian ricegrass, bluegrasses, and cheatgrass. The potential vegetative composition is about 40% grasses, 20% forbs, and 40% big sagebrush. Fire occurrence in this type is also quite frequent.

Desert Shrub This vegetative type comprises about 20% of the vegetative composition within the VFO. This type occurs on alluvial terraces, fans, and foothills on all aspects. Slopes range from 0 to 30% but slope gradients of 0 to 8% are most typical. Elevations range from 5,000 to 6,000 feet. The plant community is characterized by shadscale, bud sage, Squirrel tail and Indian ricegrass. Potential vegetative composition is approximately 20% grasses, 5% forbs, and 75% shrubs. Fire occurrence in this type has been historically rare.

Greasewood. This vegetative type comprises about 5 % of the vegetative composition within the VFO. This type occurs on floodplains and bottomlands. Slopes range from 0 to 8%. Elevations range from 5,000 to 6,500 feet. This plant community is characterized by black greasewood. Vegetation in this type is normally restricted to coppice mound areas (hummocks) that are surrounded by playa-like depressions or nearly level surfaces. Basin wildrye, squirrel tail, and inland saltgrass are the most prevalent herbaceous species associated with this type. Potential vegetative composition is about 25% grasses, 5% forbs, and 70% shrubs. Fire occurrence in this type has been rare.

Mountain Browse This vegetative type comprises about 15 % of the vegetative composition within the VFO. This type occurs on high mountain ridges, mountain side slopes, and plateaus. Slopes range from 4 to 75%, but slope gradients of 15 to 50% are most typical. Elevations range from 6,500 to 8,500 feet. This plant community is characterized by bitterbrush, snowberry, Utah serviceberry, black sagebrush, sagebrush, birchleaf mountain mahogany, oak, bluegrasses, Indian ricegrass, and thickspike wheatgrass. Potential vegetative composition is about 55% grasses, 15% forbs, and 30% shrubs. Fire occurrence in this type has been moderate.

Aquatic and Riparian. The riparian habitat type occupies a relatively small but important part of the VFO. Several small perennial streams have been identified as

having important riparian zones, along with the major river corridors of the Green and White Rivers. Springs throughout the district also have small amounts of associated riparian habitat. The major aquatic and riparian plants are willow, rose, cattail, tamarisk, tall whitetop, sedges, rushes, and saltgrass. Fire occurrence in this type is low to moderate.

3.5 Special Status Plants

Special Status plant (SSP) species are those which are officially listed by the U.S. Fish and Wildlife Service (FWS) and those which are designated by the BLM State Director as sensitive species. The FWS list includes species which are listed as endangered, threatened, proposed endangered, proposed threatened, and candidate. The State Director's list includes the FWS species list and other species which are of concern to the BLM. Both lists are changed and updated as new information becomes available. A list of SSP species known to occur on public land within the VFO is located in Appendix B. All potential habitat for these species has not been inventoried.

3.6 Wildlife

While the VFO contains many species of wildlife, only those species of management concern and those that could be affected either in a positive or negative manner by ESR activities are discussed here. It should be noted that when wildfire and the associated rehabilitation occur in riparian areas, all local wildlife would likely be affected.

Mammals. The primary mammals with respect to ESR projects are the big game and fur bearing species. Elk, moose, and mule deer, are normally found in the higher elevations and pronghorn antelope, are normally found in the broad open valleys. Fur bearing species include coyote and bobcat. Rabbit and rodent populations could be affected by EFR activities.

Birds. Upland game birds likely to be affected by ESR activities are chukar partridge, sage grouse, and blue grouse as well as various raptor and passerine species.

Special Status Animal Species.

A list of federally endangered, threatened, candidate, and state sensitive species known to occur on public land within the VFO is located in Appendix A.

3.7 Wild Horses.

There are three wild horse management areas within the VFO. They are the Winter Ridge, Hill Creek, and Bonanza herd management areas, though at this time, the Bonanza HMA does not have any wild horses occupying the unit.

3.8 Livestock

Livestock production is a major industry in the field office. There are 164 allotments which supply approximately 153,214 AUMs of forage. Livestock classes include cattle, sheep and some domestic horses.

3.9 Cultural Resources

The Vernal Field Office has a rich cultural history spanning thousands of years, from the Paleoindian Period through historic times. Past human activity is evidenced by a large and diverse assemblage of prehistoric and historic archaeological sites and architectural remains. Approximately 5,000 archaeological sites have been recorded within the Vernal Field Office. This figure represents a small portion of the sites that potentially exist. Prehistoric cultural resources that have been recorded include: rock art, open camp sites, village sites, rockshelters and caves, artifact scatters, architectural sites, resource procurement sites, ceremonial sites, human burials, and trails. Historic period cultural resources in the area include: aspen art and historic inscriptions, architectural sites, artifact scatters, burials and cemeteries, mining sites, oil and gas industry sites, transportation sites and routes, irrigation systems and canals, and privies and outhouses. About 30-50% of the recorded sites are considered eligible for the National Register of Historic Places. The field office currently manages two sites that are listed on the National Register of Historic Places.

In addition to an abundance of archaeological sites, the field office also contains areas of traditional cultural value. A number of tribes, including the Northern Ute Tribe, retain traditional and religious ties to public lands and resources within the field office. Traditional Cultural Properties include sites, landscapes, and resources that are associated with “cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community” (Parker and King 1989:1). Within the Vernal Field Office, three archaeological sites and two gathering areas have been identified as Traditional Cultural Properties.

3.10 Visual Resources Management

The visual resources in the field office were inventoried for scenic quality, visual sensitivity, and distance zone in accordance with BLM Manual 8400, and were found to vary from VRM Class I to VRM Class V. The scenic character of the area is one of isolation, remoteness, open space, and variation in landform, vegetation, and color, with large portions of the field office having only scattered evidence of human development. The landscape includes broad, semi-arid and arid valleys separated by mountain ranges. Visible human developments include roads, transmission lines, fences, structures, agricultural lands and community sites.

3.11 Special Designation Areas

Within the VFO there are two categories of lands that have been given special designation.

1) Wilderness Study Areas (5 units) Management of these areas is guided under BLM Manual H-8550-1, Interim Management Policy and Guidelines for Wilderness Study Areas.

2) Areas of Critical Environmental Concern (6 units) The Diamond Mountain RMP designated 6 ACECs, covering about 177,600 acres. Specific management objectives and prescriptions are defined for these areas in the RMP.

4.0 ENVIRONMENTAL CONSEQUENCES

Proposed Action

4.1 Soils/Watershed

After a burn, the soil would be exposed to extensive wind and water erosion. Soil erosion would increase by as much as 6 times from the pre-burn condition. Once the burn is rehabilitated, soil erosion would be equal to or less than before the fire. In the short term, soil erosion could be over five tons/acre/year until the new vegetation is established. Soils would be stabilized after the vegetation has established. Minor soil compaction along new/reconstructed fence lines would occur from vehicular traffic. There would be areas of surface disturbance in the immediate area where erosion control structures are built. These retention dams and sediment ponds would catch a large volume of rapidly moving water and sediment, allowing a small outflow to occur. The reduced flow below the dam would lessen erosion action of the water.

Where fires burn vegetation next to live streams, there would be some deterioration of water quality and an increase in run-off and sediment yield. Establishment of the desired plant community would improve water quality by reducing the above affects. Erosion control structures, along with the reestablished vegetation, would help slow the water movement caused by intense, heavy thunderstorms, and increase water holding capacity. As the water is retained, it would infiltrate into the soil, thus increasing the water supply for the new plants. Gully bank-sloughing and head-cutting would be reduced. Water erosion could result in a plant community dominated by cheatgrass. Fires originating in this community would likely spread to previously unburned areas. Cheatgrass communities are prone to a sequence of recurring fires that would lead to increased water erosion, especially during the interim between a fire and the reestablishment of the cheatgrass community. This erosion could, in many cases, affect nearby waters and associated fisheries due to increased sediment yield.

Mitigation: None

Unavoidable Adverse Impacts: Areas of soil surface disturbance where fences and erosion control structures are built.

4.2 Air Quality

Strong winds may carry large amounts of dust and ash into the air after a fire occurs, resulting in short periods of air quality degradation. Revegetation efforts would stabilize the soil by increasing ground cover, which would decrease the loss of soil and ash to wind erosion.

Mitigation: None

Unavoidable Adverse Impacts: Short term decline of air quality in localized areas.

4.3 Vegetation.

The effects of fire on vegetation is a function of many factors, but the two most important factors are the type of fuel and the velocity of the fire.

The success of seedings sown by rangeland type drills is usually quite high (80 to 95%). Failures can usually be attributed to lack of adequate moisture especially in the spring months, though high temperatures, high evaporation rates, wind damage to seedlings, use of weak or poorly adapted species, and slow growth during the seedling stage are frequent causes of failure. If the site is capable of supporting a rangeland seeding, the seed is of high quality and planted at the correct depth and there is little competition from weeds species such as cheatgrass, the chance for success is high.

The success of seedings where the seed has been broadcast or aerially seeded and not covered by soil is low (10 to 15%). Success increases with increased precipitation and elevation. Depending on soil and moisture conditions, much of the broadcast seed frequently does not germinate while much of the seed that does germinate does not establish due to shallow root development. Research has shown the success rate from aerial seeding increases when the seeds are covered by soil. The most practical method of covering seed over large acreages is by dragging an anchor chain across the planting.

In those areas where burned tree skeletons and debris remain, one effect of this process is to knock over the stumps and break up the limbs. This scattering of debris provides benefits to the seeding by providing shade and litter, which helps retain moisture for germination. The scattered debris also decomposes more quickly than if left standing, thereby providing litter and nutrients for the soil. Where shrub seedlings have been planted, the success has been variable. Moisture is again a critical factor. Damage to seedlings by rodents can also be a cause of failure. While seeding of native species is preferable, several factors effect this option. They are:

1. Large quantities of native seed are not readily available.

2. The germination rate and seedling vigor for native seed is often low, particularly in Utah's arid environment.
3. On some of Utah's arid sites, seeding of native species has failed due to a combination of arid conditions, altered site potential, and establishment of invasive annual weedy species (such as cheatgrass and State listed noxious weeds). On such sites it may be determined that it is necessary to use highly competitive cultivars that are adapted to the site conditions.
4. The cost of native species greatly exceeds that of the naturalized cultivated species.
5. Resource management objectives can not be met with native species, ie. competition with weedy species, soil loss, watershed protection, etc.

While native seed supplies are constantly improving, current available supplies are not adequate to meet existing demand. When and where the availability and cost of native seed becomes less limiting, and resource objectives can be met with native species, they would be used.

4.4 Special Status Plants

As per the proposed action, site specific surveys and/or clearances would be completed prior to the implementation of any ESR treatments. In addition, seed mixes would be designed to minimize potential competition and genetic interactions with Special Status Plant species for both known populations and within potential habitat. With these actions included in the proposed action, then the impacts to Special Status plants is expected to be minimal.

Mitigation: None

Unavoidable Adverse Impacts: None

4.5 Wildlife.

Assuming cheatgrass does not dominate the burned area, the proposed action could lead to increased forage for wildlife (primarily grasses for lactating animals in the spring). Successful rehabilitation of burned areas would generally benefit deer, elk, and antelope, when the seed mixture incorporates browse and forbs on winter and yearlong ranges. Positive impacts would be enhanced by maintaining irregular edges, islands of vegetation, and stringers of vegetation created by the fire. Required temporary fencing would have a minimal impact on wildlife since any fencing would follow BLM fencing stipulations. Small game and non-game species may have some minor additional mortality during the rehabilitation effort. Use of a burned area would generally decline until some type of revegetation occurs. Use of the area by mammalian and avian

predators in the short term would also decline due to loss of the prey base. Leaving the islands and stringers would provide escape routes and cover for the remaining wildlife. As revegetation occurs, numbers and diversity of wildlife would increase. There would be a short term period during the time that on the ground ESR treatments are implemented where wildlife species could be displaced by human activity.

Proper rehabilitation specifically designed for sage grouse, could over time, improve sage grouse habitat by improving forb abundance, and creating open areas which may serve as booming grounds. The seeding of the particular species of *Tridentia* would allow for a faster recovery of the sagebrush than by natural recovery, especially where the Wyoming variety is affected. Where fisheries are potentially threatened by conditions created by wildfire, proper rehabilitation efforts could have a positive benefit by reducing sediment yield and flooding hazards. Protection of streams from grazing allows time for understory and overstory vegetation to reestablish.

Mitigation: None

Unavoidable Adverse Impacts: Short term displacement of wildlife during the ESR implementation period.

4.6 Wild Horses.

Wild horse populations would benefit from a more reliable forage source. New fencing used in rehabilitation project could impair the movement of the wild horses. However, any fences in wild horse management areas would usually only be temporary (2 years typically). Water retention behind newly constructed structures would provide additional water sources for wild horse use.

Mitigation: None

Unavoidable Adverse Impacts: Short term (1-2 years) loss of forage.

4.7 Livestock.

Deferment of grazing for one or two growing seasons could have a short term economic effect on livestock operators as other grazing sources must be found. There would also be the possibility of longer periods of forage loss, beyond 1-2 years, depending upon the success of rehabilitation efforts. In the long term, successful rehabilitation would provide a more reliable forage source, and depending upon pre wildfire conditions, an increase in available forage. Additional water sources that could develop from the construction of any new water retention structures would also benefit livestock use.

Mitigation: None

Unavoidable Adverse Impacts: Short term (1-2 years) loss of available forage, with the possible longer term loss of forage, depending upon the success of rehabilitation efforts.

4.8 Cultural Resources.

The impacts to cultural resources from seeding activities would vary depending on the method(s) used. A study to determine the effects of using a rangeland drill pulled by a rubber tired tractor on lithic scatter sites was conducted by a BLM archaeologist near Elko, Nevada. Fifty-two artifacts were placed and mapped at two artificial sites (a control site and a seeded site) to determine the amount of artifact movement caused by drilling activities. At the control site, one artifact moved 9 centimeters and three artifacts moved a few centimeters. All of the artifacts were found. At the seeded site, 26 of the artifacts had moved while the other 26 artifacts remained in place. Movement of the artifacts ranged from a few centimeters to 80 centimeters. Four of the artifacts could not be found. The experimenters concluded that the impacts to diffuse lithic scatter sites were relatively low if the drilling was done using a rubber tired tractor driving in a straight line. It was also concluded that sites containing higher site densities and/or features could be seriously damaged. Areas where the tractor had turned exhibited greater surface disturbance, leading to the conclusion that sites located in those areas would show greater damage. The artifacts were not examined for damage caused by the drill (personal communication with Diane Pritchard, 2001).

Similarly, seeding using a seed dribbler or chaining would also cause fracturing, horizontal and vertical displacement, and mixing of cultural materials. Avoiding cultural sites during seeding activities would create pockets with no vegetation which may invite unwanted attention and possibly vandalism. In addition, avoided sites would also be more susceptible to damage caused by erosion.

In the burned areas that would be allowed to revegetate naturally, site damage caused by erosion would occur temporarily until the vegetation is re-established. A temporary lack of vegetation would also improve the conditions for the identification of cultural sites and potential vandalism. The likelihood of damage to archaeological sites from livestock trampling would be reduced during the period of time livestock grazing is excluded from the burned areas.

Impacts caused by the construction of erosion and sediment control structures would vary depending on the type of structure being constructed. Structures that require surface disturbance have a greater potential for damaging archaeological materials. Conversely, structures such as straw wattles that require no surface disturbance would have little impact on cultural resources. The construction of erosion and sediment control structures would reduce the impacts to cultural resources from erosion and sedimentation. The construction/repair of support facilities such as fences, gates, and cattleguards would cause breakage, movement and mixing of cultural materials, if present.

There would still be a slight risk of damage to unknown cultural resource sites from rehabilitation efforts.

Mitigation: The types of mitigation or treatment to be applied to cultural resources would be determined by the BLM in consultation with interested Native American Tribes and the Utah State Historic Preservation Officer.

If any significant unrecorded cultural values are discovered during rehabilitation activities, work will stop immediately and the Field Office Manager and Archaeologist will be notified so proper protective action could be taken.

Unavoidable Adverse Impacts: None

4.9 Visual Resource Management.

Though the visual quality is changed by wildfire, rehabilitation efforts would not change or alter the overall line, form, and texture of the visual resource, or exceed the parameters of allowable change for any one VRM class. VRM is not expected to be impacted by the proposed action.

Mitigation: None

Unavoidable Adverse Impacts: None

4.10 Special Designation Areas. As per the proposed action, these areas would be evaluated on an individual basis. For these areas overall, a successful and rapid reestablishment of perennial vegetation would help heal visual scars, protect soils, and minimize the spread of cheatgrass and the invasion of noxious weeds which in turn would help maintain the appearance of naturalness. Most ESR treatments wouldn't affect the suitability of any existing WSA for wilderness designation because native seed mixtures would be used and surface disturbing activities would be those only allowed for under the Interim management policy for lands under wilderness review (imp) H-85550-1. For the ACEC's, the proposed action would involve implementing ESR practices that are consistent with the management objectives and prescriptions for that ACEC, reducing impacts to the qualities of that ACEC.

Mitigation: None

Unavoidable Adverse Impacts: None

5.0 Cumulative Impacts

Additional fires occurring within the same area would increase the impacts to the various natural resources such as, soil, vegetation, water, and wildlife. There would be less native vegetation to serve as a seed source for the burned area, and to provide cover for wildlife species. Immediate action to rehabilitate the burned areas would help assure that long-term productivity of watershed and rangeland values would be protected. Because many seeded species are fire tolerant and/or fire resistant and stay green longer, the seeding areas would act as natural fire breaks for future fires.

6.0 List of Outside Persons, Groups, Agencies Contacted

Southern Utah Wilderness Alliance
Northern Ute Tribe

7.0 Intensity of Public interest

Overall, the proposed NYFRP and ESR plan is expected to generate very little public controversy, as past ESR projects have not generated minor public interest. However, site-specific ESR plans developed as a result of an individual wildfire occurrence could generate public interest, depending upon the area that is proposed for ESR treatments.

8.0 List of Preparers

Marnie Wilson	Cultural Resources
Steven Strong	Soils, Watershed, Vegetation
Robert Specht	Special Status Plants
Robert Specht	Noxious and Invasive Plants
Mary Hammer	Special Status Animals, Wildlife
Craig Trinkle	Visual Resource Management

9.0 References

Parker, Patricia L. and Thomas F. King
1998 Guidelines for Evaluating and Documenting Traditional Cultural Properties.
National Register Bulletin 38. Washington: National Park Service, Interagency
Resources Division, Department of the Interior.

Appendix A. Federally endangered, threatened, candidate, proposed, and state sensitive species known to occur or have habitat in the Vernal Field Office district.

SPECIES	STATUS	HABITAT	POTENTIAL for and/or OCCURENCE
Colorado Pikeminnow <i>Ptychocheilus lucius</i>	Federally Endangered	Endemic to Colorado River Basin. Habitat varies depending on life stage and	Potential for occurrence depending on location of fire.

		season but includes shallow backwaters, eddies, pools, backwater areas, and deep runs.	
Humpback Chub <i>Gila cypha</i>	Federally Endangered	Endemic to Colorado River Basin, areas with deep, swift water and rocky substrates on the Green and Colorado rivers	Potential for occurrence depending on location of fire.
Razorback Sucker <i>Xyrauchen texanus</i>	Federally Endangered	Endemic to Colorado River Basin. Green River has only known spawning areas. Habitat varies depending on life stage but includes shallow water, backwaters, tributary mouths, pools, and runs.	Potential for occurrence depending on location of fire.
Bonytail <i>Gila elegans</i>	Federally Endangered	Endemic to Colorado River Basin	Potential for occurrence depending on location of fire.
Black-footed ferret <i>Mustela nigripes</i>	Federally Endangered	Occupies white-tailed prairie dog colonies in the Uinta Basin.	Potential for occurrence depending on location of fire.
Canada Lynx <i>Lynx Canadensis</i>	Federally Threatened	Higher elevations of Utah, include slopes of the Uinta Mountains, south to the Fish Lake National Forest	Potential for occurrence depending on location of fire.
Bald Eagle <i>Haliaeetus leucocephalus</i>	Federally Threatened	Typically occupy coastal areas near lakes, reservoirs, and rivers.	Potential for occurrence depending on location of fire.
Mexican Spotted Owl <i>Strix occidentalis lucida</i>	Federally Threatened	Deeply incised canyon systems and wooded areas of isolated mountain ranges. Nests are typically on cliff faces in caves and crevices.	Potential for occurrence depending on location of fire.
Mountain Plover <i>Charadrius montanus</i>	Federally Proposed Threatened	Nests in upland grass and shrub, frequently associated with prairie dog colonies	Potential for occurrence depending on location of fire.
Western Yellow-billed Cuckoo <i>Coccyzus americanus occidentalis</i>	Federal Candidate	Dense lowland riparian habitat, usually with willows.	Potential for occurrence depending on location of fire.
Ferruginous Hawk <i>Buteo regalis</i>	State Threatened	Grasslands, shrub lands, and steppe deserts	Potential for occurrence depending on location of fire.
Roundtail Chub <i>Gila robusta</i>	State Threatened	Endemic to Colorado river Basin, runs and pools of streams	Potential for occurrence depending on location of fire.
Northern River Otter <i>Lutra canadensis</i>	State Sensitive	Rivers and creeks in Utah	Potential for occurrence depending on location of fire.
SPECIES	STATUS	HABITAT	POTENTIAL for and/or OCCURENCE
Ringtail <i>Bassariscus astutus</i>	State Sensitive	Rocky, boulder strewn riparian areas	Potential for occurrence depending on location of fire.
Northern Flying Squirrel <i>Glaucomys sabrinus</i>	State Sensitive	Riparian zones and mature coniferous forests	Potential for occurrence depending on location of fire.
Thirteen-lined Ground Squirrel	State Sensitive	Grasslands and open, semi-desert shrub land habitats	Potential for occurrence depending on location of fire.

<i>Spermophilus tridecemlineatus</i>		with well-drained soils	
Olive-backed Pocket Mouse <i>Perognathus fasciatus</i>	State Sensitive	Open areas with sparse vegetation and sandy soils (extreme northeastern corner of Daggett County)	Potential for occurrence depending on location of fire.
Brazilian Free-Tailed Bat <i>Tadarida brasiliensis mexicana</i>	State Sensitive	Caves and mines in Utah, migratory spending summers in Utah and wintering in Southwest United States or Mexico	Potential for occurrence depending on location of fire.
Townsend's Big Eared Bat <i>Plecotus townsendii</i>	State Sensitive	Occupies a variety of habitats, often found in forested areas	Potential for occurrence depending on location of fire.
Osprey <i>Pandion haliaetus</i>	State Sensitive	Along rivers, lakes, and ocean coasts	Potential for occurrence depending on location of fire.
Peregrine Falcon <i>Falco peregrinus</i>	State Sensitive	Nest in cliffs in association with riparian wetland habitats	Potential for occurrence depending on location of fire.
Northern Goshawk <i>Accipiter gentiles</i>	State Sensitive	Higher elevations in mature conifer forests and aspen stands and along valley cottonwood habitats	Potential for occurrence depending on location of fire.
Swainson's Hawk <i>Buteo swainsoni</i>	State Sensitive	Nest in trees near open desert grasslands, shrub-steppes, and agricultural fields	Potential for occurrence depending on location of fire.
Short eared owl <i>Asio flammeus</i>	State Sensitive	Open desert and semi-desert habitats, particularly near wetland vegetation	Potential for occurrence depending on location of fire.
Burrowing Owl <i>Athene cunicularia</i>	State Sensitive	Desert valleys and grassland communities, often associated with dens or burrows of prairie dog colonies.	Potential for occurrence depending on location of fire.
Three-toed Woodpecker <i>Picoides tridactylus</i>	State Sensitive	Mountain forest conifers, usually above 8000 ft.	Potential for occurrence depending on location of fire.
Lewis's Woodpecker <i>Melanerpes lewis</i>	State Sensitive	Riparian habitats of the Uinta Basin and along the Green River. Nest in cavities of tall trees, predominately sycamore, ponderosa pine, and cottonwood	Potential for occurrence depending on location of fire.
Greater Sage Grouse <i>Centrocercus urophasianus</i>	State Sensitive	Sagebrush habitats	Potential for occurrence depending on location of fire.
Long-billed Curlew <i>Numenius americanus</i>	State Sensitive	Upland meadows and rangelands	Potential for occurrence depending on location of fire.
Bobolink <i>Dolichonyx oryzivorus</i>	State Sensitive	Flooded grasslands and wet meadows of Northern Utah	Potential for occurrence depending on location of fire.
SPECIES	STATUS	HABITAT	POTENTIAL for and/or OCCURENCE
Common Yellowthroat <i>Geothlypis trichas</i>	State Sensitive	Riparian and wetland habitats, also in old fields and brushy pastures	Potential for occurrence depending on location of fire.
Utah Milksnake <i>Lampropeltis tringulum</i>	State Sensitive	Varied upland habitats ranging from pinyon-juniper	Potential for occurrence depending on location of fire.

<i>taylori</i>		woodlands, grasslands and canyons	
Great Plains Rat Snake <i>Elaphe guttata</i>	State Sensitive	Woody areas, rocky hillsides, and meadowlands along water courses	Potential for occurrence depending on location of fire.
Flannelmouth Sucker <i>Catostomus latipinnis</i>	State Sensitive	Endemic to the Colorado River Basin, rocky pools of slow-flowing, lower gradient reaches in larger rivers	Potential for occurrence depending on location of fire.
Colorado River Cutthroat Trout <i>Oncorhynchus clarki pleuriticus</i>	CS	Utah waters	Potential for occurrence depending on location of fire.

APPENDIX B. SPECIAL STATUS PLANT SPECIES **

SPECIES	STATUS	HABITAT	POTENTIAL for and/or OCCURRENCE
<i>Arabis vivariensis</i> park rock cress	Sensitive	Webber Formation sandstone and limestone outcrops in mixed desert shrub and pinyon-juniper communities. 5000-6000ft.	Occurs on East side of the District surrounding Dinosaur National Monument and on Blue Mountain.
<i>Astragalus equisolensis</i> horseshoe milkvetch	Candidate	Duchesne River Formation soils in sagebrush, shadscale, horsebrush and mixed desert shrub communities. 4790-5185ft.	Occurs in the vicinity of Horseshoe bend.
<i>Astragalus hamiltonii</i> Hamilton milkvetch	Sensitive	Duchesne, Mowery shale, Dakota and Wasatch Formation soils in pinyon-juniper and desert shrub communities. 5240-5800ft	Occurs from Lapoint to Vernal, west edge of Vernal and near Steinaker Reservoir.
<i>Cirsium ownbeyi</i> Ownbey thistle	Sensitive	East flank Uinta Mountains. Sagebrush, juniper and riparian communities. 5500-6200ft.	Occurs on drainages that drain into the Green River.
<i>Penstemon acaulis</i> stemless penstemon	Sensitive	Daggett County. Semi-barren substrates in pinyon-juniper and sagebrush-grass communities. 5840-7285 ft.	Occur in Clay Basin and Browns Park
<i>Penstemon flowersii</i> Flowers penstemon	Sensitive	Clay badlands from Myton to Roosevelt and Randlett, in shadscale and desert communities. 5000-5400ft.	All populations on private land, potential on edge of BLM adjacent to Pelican Lake to Myton.
<i>Penstemon gibbensii</i> Gibbens penstemon	Sensitive	Brown's Park in Daggett County. Sandy and shaley (Green River Shale) bluffs and slopes with juniper, thistle, Eriogonum, Elymus, serviceberry, rabbit brush & Thermopsis 5500-6400 ft.	Occurs in Brown's Park.

<i>Penstemon goodrichii</i> Goodrich penstemon	Sensitive	Lapoint-Tridell-Whiterocks area. Duchesne River Formation on blue gray to reddish bands of clay badlands. Elevations 5590 to 6215 ft.	Occurs on habitat from Vernal to Lapoint on BLM and Lapoint to Tridell on private and Tribal lands.
<i>Penstemon grahamii</i> Graham beardtongue	Candidate	East Duchesne and Uintah Counties. Evacuation Creek and Lower Parachute Member of the Green River Formation. Shaley knolls in sparsely vegetated desert shrub and pinyon-juniper communities. 4600-6700 ft	Occurs from Raven Ridge to Desolation Canyon.
<i>Penstemon scariosus</i> var. <i>albifluvis</i> White River penstemon	Candidate	Evacuation Creek and Lower Parachute Creek Member of the Green River Formation on sparsely vegetated shale slopes in mixed desert shrub and pinyon-juniper communities. 5000-6000ft	Occurs From the White River to the Rainbow Area and potentially to Desolation Canyon.
<i>Schoenocrambe argillacea</i> Clay thelopody	Threatened	Bookcliffs On the contact zone between the upper Uinta and lower Green River shale formations in mixed desert shrub of Indian ricegrass and pygmy sagebrush. 5000-5650 ft.	.Occurs from Hill Creek west to Fourmile Wash area.
<i>Schoenocrambe suffrutescens</i> Shrubby reed-mustard	Endangered	Evacuation Creek and lower Parachute Creek Members of the Green River Formation on calcareous shales in pygmy sagebrush, mountain mahogany, juniper and mixed desert shrub communities. 5400-6000ft.	Occurs from Hill Creek to Nine mile Creek
<i>Sclerocactus glaucus</i> (<i>Sclerocactus brevispinus</i>) Uinta Basin hookless cactus	Threatened	Gravelly hills and terraces on Quaternary and tertiary alluvium soils in cold desert shrub communities. 4700-6000ft.	Occurs from Bitter Creek to Parriette Wetlands area.
<i>Spiranthes diluvialis</i> Ute lady's tresses	Threatened	Streams, bogs and open seepages in cottonwood, salt cedar, willow and pinyon-juniper communities on the south and east slope of the Uintah Range and it's tributaries, and the Green River from Browns Park to Split mountain. Potentially in the Upper reaches of streams in the Book Cliffs. 4400-6810ft.	Occurs from Browns Park to the Vernal area.

